



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/822,414	04/12/2004	Dong Woo Gim	1802.04	2567

7590 05/04/2005

LAW OFFICES OF PARK & ASOCIATES
3600 WILSHIRE BLVD., SUITE 1722
LOS ANGELES, CA 90010

EXAMINER

DINH, JACK

ART UNIT PAPER NUMBER

2873

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center">Office Action Summary</p>	Application No. 10/822,414	Applicant(s) GIM ET AL.	
	Examiner Jack Dinh	Art Unit 2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 March 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 and 30-33 is/are rejected.
- 7) ☒ Claim(s) 26-29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>0305</u> . | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
6) <input checked="" type="checkbox"/> Other: <u>DETAILED ACTION</u> . |
|---|--|

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 4, the phrase “within a unit time which is less than or equal to the afterimage time of the human eye” renders the claim indefinite. It is unclear of the exact time duration being claimed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-12, 15-17, 19-25, 30-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanedo et al. (Proceeding of SPIE Vol. 4075: 24-31) in view of Cho (Proceeding of SPIE Vol. 5055: 278-286).

Regarding claim 1, Kanedo (figure 6) is interpreted as disclosing a three-dimensional imaging device comprising a focusing lens (dynamic focusing lens), an imaging unit (image sensor) on which an image of the object at a given focal length of the focusing lens is formed, an image processing unit (computer image processing unit) processing the image on the imaging unit to produce a two-dimensional image at the given focal length. Kanedo is interpreted as disclosing all the claimed limitations except that the focusing lens is a micromirror array lens type. Within the same field of endeavor, Cho (abstract, page 12/20, and figures 1-4) discloses a fast-response variable focusing lens made of micromirror array lens. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the variable focusing micromirror array lens, as taught by Cho, for the purpose of increasing the response time.

Regarding claim 2, Kanedo (section 2.3) further discloses that the focal plane of the three-dimensional imaging device is changed by the focal length of the focusing lens.

Regarding claim 3, Kanedo (section 2.3, figure 6) is interpreted as further disclosing that the imaging unit comprises a two-dimensional image sensor taking the two-dimensional image at each focal plane.

Regarding claim 4, Kanedo (section 2.3) is interpreted as further disclosing that the image processing unit generates all-in-focus image and depth information for the all-in-focus image from the two-dimensional images.

Regarding claims 5 and 6, Cho (abstract, page 12/20, and figure 4) is interpreted as further disclosing that the micromirror array lens comprises a plurality of micromirrors wherein each of the micromirrors is controlled to change the focal length of the micromirror array lens.

Regarding claims 7-9, Cho (abstract, page 12/20) is interpreted as further disclosing that the rotational motion and the translational motion of each of the micromirrors are controlled.

Regarding claims 10-12, Cho (figure 3) is interpreted as further disclosing that the micromirrors are arranged to form one or more concentric circles, wherein each micromirror of the micromirror array lens has a fan shape, and wherein the reflective surface of each micromirror of the micromirror array lens is substantially flat.

Regarding claims 15-17, Cho (abstract, page 12/20, and figure 4) is interpreted as further disclosing that the micromirror array lens is actuated by electrostatic force. Although Cho does not explicitly disclose the use of electromagnetic force, it is within the knowledge of one skill in the art to substitute the actuating components with many other known electric forces as desired. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use electromagnetic force for the purpose of selecting a desired electric force to actuate the mirrors.

Regarding claim 19, Cho (figure 2) is interpreted as further disclosing that the micromirrors is arranged in a flat plane.

Regarding claim 20, Cho (figure 7) is interpreted as further disclosing that the micromirror array lens further comprises a plurality of mechanical structures upholding the micromirrors and actuating components actuating the micromirrors, wherein the mechanical structure and the actuating components are located under the micromirrors.

Regarding claim 21, Cho (figure 1b) is interpreted as further disclosing that the micromirror array lens is a reflective Fresnel lens.

Regarding claims 22-25, Kanedo in view of Cho is interpreted as disclosing all the claimed limitations except that the lens compensates for phase errors of light due to the medium between an object and its image, or corrects aberrations, or corrects the defects of an imaging system that cause the image to deviate from the rules of paraxial imagery, or that the object which does not lie on the optical axis can be imaged by the lens without macroscopic mechanical movement. However, although Kanedo in view of Cho does not explicitly disclose these applications of the lens, the features of the Applicant's variable focal length lens is not distinguished from the prior art, as described above. Different applications of the device can be realized by those skill in the art. In other words, a claim disclosing a different use for a known device is not sufficient to gain patentable weight. Therefore, it would have been obvious to one

Art Unit: 2873

of ordinary skill in the art at the time the invention was made to provide these limitations for the purpose of further interpreting different uses for the lens.

Regarding claim 30, Kanedo in view of Cho is interpreted as disclosing all the claimed limitations except for a beam splitter positioned in the path of light between the imaging unit and the micromirror array lens. However, it is within the knowledge of one in the art that beam splitter can be positioned in the path of light between two or more components to reflect or transmit light to each component directly from the same axis or orthogonally. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the beam splitter positioned in the path of light between the imaging unit and the micromirror array lens, for the purpose of positioning the beam splitter in the same optical axis as the imaging unit.

Regarding claim 31, Kanedo in view of Cho is interpreted as disclosing all the claimed limitations except for explicitly stating that the micromirror array lens is positioned so that the path of the light reflected by the micromirror array lens is not blocked. However, since the micromirror array lens is a reflective type, it cannot be positioned directly in between the object and the imaging unit. Therefore, it would be obvious to have the micromirror array lens angled relative to the object and the imaging unit, to reflect the light path from the object to the imaging unit, so that the path of light reflected by the micromirror array lens is not blocked. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the micromirror array lens angled to reflect the light path from the object to the imaging

Art Unit: 2873

unit, for the purpose of avoiding the blocking of light path by the reflective-type micromirror array lens.

Regarding claims 32 and 33, Kanedo in view of Cho is interpreted as disclosing all the claimed limitations except for further comprising an auxiliary lens having a predetermined focal length or numerical aperture. It is within the knowledge of one skilled in the art that auxiliary lens are designed to add to an existing optical system to form a composite optical system, wherein adding an auxiliary lens with a predetermined focal length or numerical aperture can change the focal length or numerical aperture of the whole system. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide an auxiliary lens having a predetermined focal length or numerical aperture, for the purpose of adjusting the focal length and numerical aperture of the whole optical system to a desired range.

3. Claims 13, 14, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanedo et al. (Proceeding of SPIE Vol. 4075: 24-31) in view of Cho (Proceeding of SPIE Vol. 5055: 278-286), as applied in claim 1, and further in view of Watanabe et al. (US Patent Publication 2002/0102102).

Regarding claims 13 and 14, Kanedo in view of Cho is interpreted as disclosing all the claimed limitations, as described above, except that the reflective surface of each micromirror of the micromirror array lens has a curvature wherein the curvature is controlled. Within the same field of endeavor, Watanabe is interpreted as further disclosing that the reflective surface of the

Art Unit: 2873

mirror has a curvature (figure 6D or 6E) that can be controlled by electrostatic force (paragraph 0122). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made control the curvature of the micromirrors for the purpose of changing the focal length of the lens.

Regarding claim 18, Watanabe is interpreted as further disclosing that the surface material of the mirror is the one with high reflectivity or metal compound (paragraph 0150).

Allowable Subject Matter

4. Claims 26-29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter. Regarding claim 26, the prior art fails to anticipate or fairly suggest the claimed structure of the micromirror array lens can satisfy the same phase conditions for each wavelength of Red, Green, and Blue, respectively, to get a color image. The claimed invention is therefore considered to be in condition for allowance as being novel and non-obvious over prior art.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack Dinh whose telephone number is 571-272-2327. The examiner can normally be reached on M-F (9:30 AM - 6:00 PM).

Art Unit: 2873

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Y. Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jack Dinh



Georgia Epps
Supervisory Patent Examiner
Technology Center 2800